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Polystichum californicum

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Sallie D. Allen, Editor

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Polystichum californicum
Mareen Kruckeberg



The Mysteries of *Polystichum californicum*

Ed Alverson, Bellevue, Washington

The genus *Polystichum*, with a total of a dozen or so species, is one of the largest groups of native ferns in western North America. Some species, such as the sword fern, *P. munitum*, and the holly fern, *P. lonchitis*, are common and well known ferns. Others, such as the California sword fern, *P. californicum*, are delightfully obscure, and are known to only a handful of botanists and fern enthusiasts. Actually, the name *P. californicum* covers a wide range of plants varying in frond size, degree of dissection, and habitat preference; the present state of its taxonomy is tentative at best. Nevertheless, its story is a mysterious and complex one. It is a story that deserves to be told.

Polystichum californicum, as currently construed, is a lowland species restricted to the coastal portion of western North America, ranging from central California to southwestern British Columbia. The typical form of the species, from the southern portion of its range, is a plant of streambanks and moist shady forests, primarily in the redwood and mixed evergreen forest zones. Such plants tend to resemble the common sword fern, *P. munitum*, in size, texture, and habit, the difference being that the fronds are more finely dissected, with the pinnae deeply lobed rather than simply serrate, or sword-like. The plants ranging from northern California northward through Washington into British Columbia show a marked preference for drier, rocky habitats, particularly on and around cliffs. Such plants tend to be smaller in stature, with a stiffer frond texture, and with imbricate pinnae (the leaflets are rotated from the plane of the rachis, or leafstalk, much like steps on a ladder). Despite the marked tendencies of these two forms, not all specimens can be placed with certainty into one category or the other, and without the evidence needed to make a clearcut separation, the two forms have not been separated taxonomically.

The depth of the confusion can be felt by visiting a locality where *Polystichum californicum* grows. Within a single population one can observe a multitude of variation that is caused by nongenetic factors, such as substrate, exposure, and size. Hybrids with other species of *Polystichum* that are present also help to confuse the picture. This is as true today as it was eighty years ago, when early Northwest plant-finder J. B. Flett first discovered the northern, cliff-dwelling form of *P. californicum*. He found this fern growing upon cliffs in the foothills of the Cascades, southeast of his hometown of Tacoma, Washington. His experience is revealed to us in a short article in the 1902 volume of the Fern Bulletin:

" . . . In the crevices of the rock *Polystichum californicum* was wedged in so that it was difficult to get it out There were three forms of the species. One answered to the description of *P. californicum*, and the smallest form to *P. scopulinum*. These two run into each other imperceptibly. Neither of them is worthy of specific rank. A third form of this group . . . is much larger than the other forms. Its shape and habit of growth is very similar to that of *P. munitum* It occurred to me that it might be a hybrid between the two species mentioned 1

Flett was on the right track, but it wasn't until the advent of modern cytological techniques, which allow observation of chromosome numbers and pairing behavior, that any substantial new headway could be made in our understanding of fern evolution and taxonomy.

In the 1960's, *Polystichum californicum* was studied by the noted North American fern expert, Dr. W. H. Wagner. He hypothesized that *P. californicum*, like several other western polystichums, is an allotetraploid species, having originated by means of hybridization between the two regular (diploid) species. While, initially sterile, subsequent spontaneous doubling of the chromosomes enabled the hybrid plant to produce viable, fertile spores. (Initial hybrids between distinct species are sterile because the two sets of chromosomes, one from each parent, are unable to form pairs, causing meiosis to be irregular.) Dr. Wagner postulated that the two parents of *P. californicum* were the sword fern, *P. munitum*, and *P. dudleyi*, a relictual rare bi-pinnate species endemic to the coastal canyons of central California. Not only did he find *P. californicum* to be intermediate in morphology between its putative parents, but he also found, in localities where all three species grew together, sterile triploid hybrids, or back crosses between *P. californicum* and its parents. The pairing behavior of the chromosomes in these back crosses provided conclusive evidence that *P. munitum* and *P. dudleyi* were the parents of *P. californicum*,² making it a classic case of "reticulate" (as opposed to divergent) evolution.

W. H. Wagner's studies did not include plants of the dry-cliff form from Oregon, Washington, and British Columbia. In fact, it wasn't until the 1970's that *Polystichum californicum* was re-collected in Washington. Dr. D. H. Wagner, who was in the process of monographing the western polystichums for his doctoral dissertation, revisited Flett's original locality southwest of Tacoma. It was D. H. Wagner, who, in his detailed examination of herbarium specimens, first recognized the differences in morphology and habitat between the plants from the Pacific Northwest and plants from central California. The morphological and ecological evidence seemed to point (albeit inconclusively) to a surprising twist in the process of reticulate evolution. It seemed that the northern, dry-cliff dwelling plants may actually have originated from hybridization between *P. dudleyi* and the imbricate sword fern, *P. imbricans*, a close but distinct relative of *P. munitum*.³ This difference in parentage would account for the dry-cliff habitat preference of the northern form, and also the differences in frond morphology such as the imbricate arrangement of the pinnae. Although at this point in time *P. dudleyi* and *P. imbricans* do not occur together or hybridize, it is not unlikely that they could have sometime in the past. Thus, the evidence points to separate origins (in geography and in time) for the two forms of *P. californicum*, rather than one form having diverged from an older, ancestral form. Unfortunately, Dr. Wagner was not able to find consistent microscopic characteristics (rachis scales, indusium margins, annulus, etc.) that could positively separate these two forms of *P. californicum*. This does not mean that the hypothesis is incorrect, but rather that more field and laboratory study is needed before such a conclusion can be scientifically validated.

But let us leave the world of cold hard science for a moment and step into the realm of creative speculation. Piecing together the knowledge that we have, it is possible to travel back in time and imagine a possible scenario that describes the separate origins of the two forms of *Polystichum californicum*. First, let us go back to pre Ice Age times, with the climate both milder and

less arid than today over large parts of the west. *P. dudleyi* is a rather common plant through the west, along streambanks and in sheltered woodlands, such as redwood forests, even extending towards adjacent drier, rocky habitats. *P. imbricans* is present on cliffs and throughout drier, rocky, open woods, but *P. munitum* is not on the scene, occurring only in cooler regions to the north. It is in the ecotonal rocky wooded areas that *P. imbricans* and *P. dudleyi* grow in close enough proximity to hybridize, and with subsequent doubling of chromosomes, we have the genesis of a new species. Over the years this scene may be repeated numerous times, creating new fertile plants that exhibit frond characteristics and habitat preferences intermediate between those of the two parents.

Moving on in time, the ice ages have arrived. *Polystichum dudleyi* has been pushed back by climatic change to a small area of coastal California, the only remaining region where it can avoid winter's cold and summer drought. Coming down from the northern Pacific coast, displaced by the advance of glacial ice, comes *P. munitum*, vigorous and prolific and enthusiastic about its new-found range. As *P. munitum* moves south, it invades the forested refuge of *P. dudleyi*. With the two species growing side by side, the stage is set for hybridization, chromosome doubling, and the creation of the southern, moist forest form of *P. californicum*. *P. imbricans* no longer grows close enough to *P. dudleyi* to hybridize, but their collective creation, the dry-cliff form of *P. californicum*, is able to find enough suitable habitat to create a niche for itself in the northwest flora.

Thus, we are brought up to the present. The older, dry-cliff dwelling form of *Polystichum californicum* occurs only in widely scattered relictual populations between northern California and southwestern British Columbia. The younger, moist-forest form is still being created denovo in sites where its parents, *P. munitum* and *P. dudleyi*, grow side by side. Although it has yet to really expand its range outside of the area in which its parents co-occur, the moist-forest form would seem to have good competitive potential for the future, what with the influence of the successful *P. munitum* in its blood. Thus our excursion through time stops but does not really end, for in evolution (and creation) the only true ending is extinction.

It should be kept in mind that the above scenario is merely speculation based upon one interpretation of the evidence that is currently available. Further field studies and laboratory work will provide us with additional clues that may alter, or at least increase in complexity, the interpretation of the history and origin of these ferns.

Whatever the true story may be, the process of investigating and developing a better understanding of the history of members of our native flora is one of the more enjoyable aspects of natural history. It is detective work that involves knowledge of geological history, botany, and ecology, as well as a capacity for intuitive thinking. Such knowledge can also help to increase the satisfaction and pleasure that is gained by cultivating such interesting plants. In fact, at this stage of the game, the successful cultivation of *Polystichum californicum* may require more curiosity and intuitive thinking than raw horticultural technique. Since this fern is scarcely known in cultivation (this is especially true of the northern, dry-cliff form), the key to growing *P. californicum* would seem to lie in understanding the preferences of the parent species (remember that such "hybrid species" exhibit intermediacy between the two parental extremes in habitat preferences, as well as frond morphology). Thus,

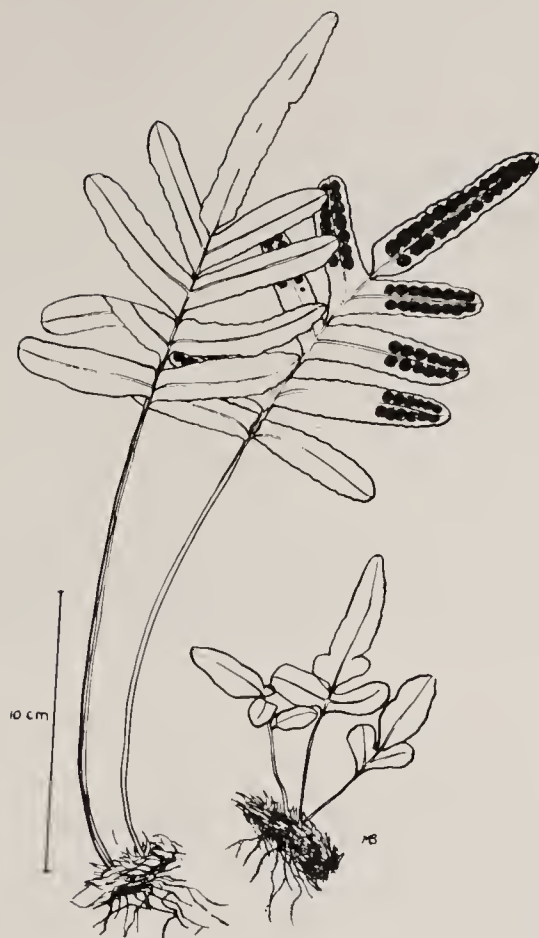
the southern, moist-forest form, with *P. munitum* as one of its parents, would tend to prefer moist, humusy soil in partial to full shade. The northern, dry-cliff dwelling form of *P. californicum*, with *P. imbricans* as one of its parents, should need partial shade to full sun, humusy soil but with sharp drainage, and probably will not tolerate supplemental summer watering. This dry-cliff form, which will be available at the NOHS fern sale on June 25 and 26, would seem to have considerable potential as a small evergreen rock-fern in the same league as *P. scopulinum* and *P. kruckebergii*. Its advantage would be that since it occurs naturally only at low elevations west of the Cascade Range (reports from the Wenatchee Mts. are based upon a misidentification), it should be well adapted to the mild, rainy winters that are so typical of the maritime Northwest. I have had a plant of the dry-cliff form growing in a north-facing rockery for three years, where it has been living contentedly but has maintained its small size, the fronds being no more than four or five inches long. At this small size it is quite charming, with twisted fronds radiating both horizontally and vertically, imbricate as overlapping pinnae, and sharp, spinulose toothed margins. So it would seem to have a place as a welcome lowland counterpart to the difficult high elevation, rock-dwelling native polystichums.

The cultivation of rare or unusual native plants is both interesting and exciting, but it also reminds us of the vulnerability of rare plant populations to being over-loved and over-collected. The northern, dry-cliff form of *P. californicum* is particularly vulnerable, as it is known from less than ten sites within its 700 mile range, and possesses such a low competitive vigor that it probably would not be able to recover from depletion due to collecting pressure. We are fortunate that ferns are easily grown from spores; one frond sacrificed to the spore pocket can result in dozens of young plants available for cultivation. So if you happen to encounter this fern in the wild, consider yourself lucky. Observe it and photograph it and appreciate it, but most of all, leave it be, so that future fern finders may be afforded the same opportunity.

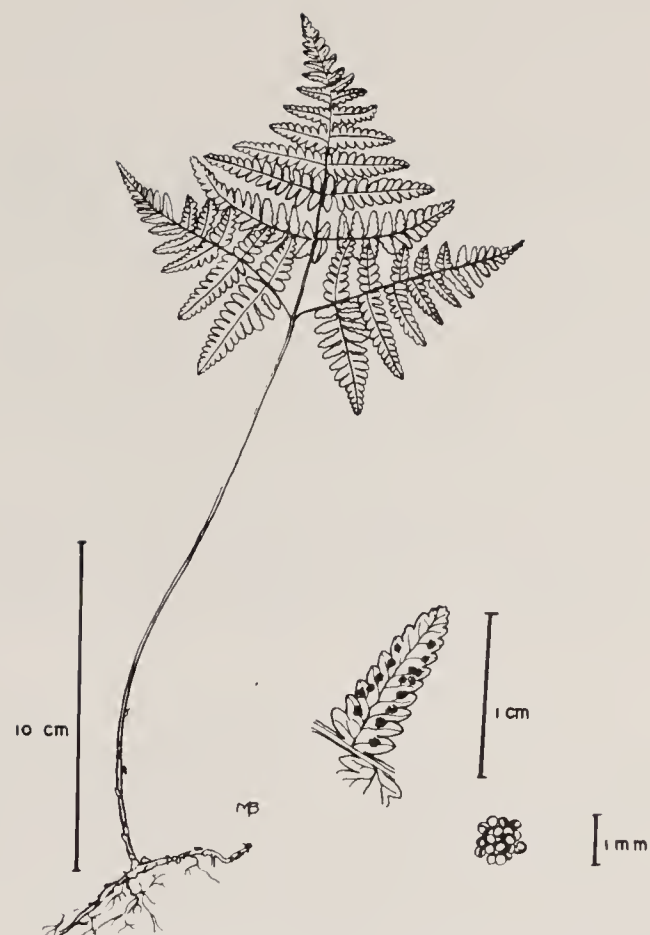
My hope is that this interesting but obscure fern will be widely grown, studied, and appreciated, both because it can help us to develop a greater knowledge of our physical (and aesthetic) surroundings, and also because it can contribute to the character and diversity of Northwest horticulture.

References

1. Flett, J. B. 1902. "Notes on Some Rare Washington Ferns." Fern Bulletin, vol. X, p. 24-25.
2. Wagner, W. H. 1973. "Reticulation of Holly Ferns (*Polystichum*) in the Western United States and Adjacent Canada." American Fern Journal, vol. 63, p. 99-115.
3. Wagner, D. H. 1979. "Systematics of *Polystichum* in Western North America North of Mexico." Ptesidologia, no. 1.



Polypodium scolieri



Gymnocarpium dryopteris



Pityrogramma triangularis



Asplenium trichomanes

FERN SALE

You will find these choice native ferns at the NOHS Fern Sale, June 25th and 26th, Crossroads Shopping Mall, N. E. 8th St. and 156th Ave. N.E. Hours: 10 A.M. to 9 P.M. Friday; 10 A.M. to 6 P.M. Saturday.

Polypodium scolieri, *Gymnocarpium dryopteris*, *Pityrogramma triangularis*, reprinted by permission from The Ferns and Fern-allies of British Columbia by T. M. C. Taylor. *Asplenium trichomanes* drawing by Mareen S. Kruckeberg.

Layers of a Hokkaido Forest

Brian Halliwell, Royal Botanic Garden, Kew, England

Part III. A Japanese Forest Floor

Of all the layers of a Hokkaido forest, it is the ground cover which is the richest. Of plants found there, many are suitable for growing in gardens as ground covers.

Probably the commonest ground cover plant for shade in gardens is *Pachysandra terminalis*. It spreads quickly colonizing bare ground beneath trees and shrubs to provide an evergreen carpet through which no weed can penetrate. It is rather a dull plant and its greenish-white flowers have little beauty; the variegated form is scarcely an improvement and is less satisfactory for ground cover for it is slower to colonize. I used to agree with Farrer who wrote in The English Rock Garden, "Not very interesting hardy dowdy of mere foliage interest useful to cover the ground in sheltered places but of little charm; has the merit of coming from Japan and the vice of variegation." Having seen this plant in the wild I must revise my opinion for in October plants in the forest were covered with white oval to round fleshy fruits which transformed what to me had always been a rather dull plant. I can find no garden book which even mentions fruit and even in botanical tomes there is but the vaguest reference. Why are not fruits seen in cultivation? Male and female flowers are produced on the same plant but separately. Is there perhaps but one clone in cultivation? Is it sterile? Are plants functionally unisexual? Is the pollinating agent missing? Whatever it is we are missing the most attractive feature of this plant.

With its specific epithet *Cornus canadensis* should be confined to North America but it is widespread in Hokkaido forests. The colourful fruit was scarce and occasionally seen. On the otherhand another North American plant found on the floors of Japanese forests was *Rubus pedatus*. It is a useful ground cover plant for gardens when the soil is moist for its thornless stems with trifoliate leaves quickly colonize and the tiny white flowers are followed by red fleshy fruits which are pleasant eating.

Shortias could never be described as ground cover plants although Margery Fish suggests that where conditions suit they can form extensive mats. *Shortia* (*Schizocodon*) *soldanelloides*, a variable species extends in Japan from the upper level of the forest into the alpine scrub. It has branching creeping stems with terminal clusters of a few evergreen leaves which are roundish or orbicular, with toothed edges. There are many forms with leaves of varying sizes and in some, in fall and winter, the leaves can become a dark red in good light. One-sided racemes of fringed pink flowers are produced in late spring. From Margery Fish's book one might be misled in thinking that this is an easy plant to grow, but this is not so.

Epimedium, a useful genus from *Berberidaceae* in gardens, has a wide distribution in Europe and Asia. Rather slow at colonizing, they can still be used in a garden for groundcover for they produce a mat of impenetrable roots. Though growing well in deep shade they are better with plenty of light when flowering is much better. All species have attractive light green foliage which is compound but with varying numbers of leaflets. When these are young they are pinkish and in late fall and during winter they take on reddish hues. By the end of the winter though the leaves become tattered and in early spring before new growth has begun to show they are best cut off which allows new leaves to develop more fully and to show off the flowers which vary from white to yellow and through the shades of pink to red, and mauve. In Japan, there are six species but only two are to be found in Hokkaido. *E. grandiflorum* has large flowers ranging from white to pale purple and *E. koreanum* where they are yellow.

Gentians are mostly plants for the rock or peat garden, only a few are large enough or sufficiently showy for the woodland garden. The best known is the European *Gentiana asclepdeia*, willow gentian, with arching sprays of blue or white flowers. Common in Hokkaido forests and which would be suitable for gardens of the west is *G. triflora*. It can reach four feet in height, does not arch and has upright flowers of reasonable size in the upper axils; in Japan it is cut and sold as a florist's flower mostly from wild gatherings. From the same family is *Tripterspermum japonicum* which is scandent or a weak climber often sprawling over a moist shady bank or growing up through any other neighbouring plants. Purplish gentian-like flowers are quite tiny and are less showy than the large fleshy red or purple fruits which follow.

The buttercup family has many beautiful members in these forests. The genus *Coptis* is little seen in cultivation in spite of the favour expressed for it by Farrer. There are delicate small leaves which are usually in threes although in *C. quinquefolia*, the number is five; delicate white flowers appear in spring or early summer. *Hepatica nobilis japonica* seems to be a harbinger of spring for there can be flowers open in a mild winter on Christmas Day which will continue intermittently for three months depending on weather. Though smaller than the usual European forms, flower colour can be white, mauve, blue, pink or red. *Glaucidium palmatum* was once in *Ranunculaceae* and has been in *Papaveraceae* but now seems to be in a family of its own, *Glaucidiaceae*. On a single stem there are a few pale green leaves lobed like a maple leaf. Above is a nodding poppy-like flower of four petals which are lavender in colour; this is followed by an upright ribbed flattened seed pod about three-quarter inch in length. Although it could be found growing in the deepest shade it was most abundant where trees were well spaced and light good.

It was a magnificent sight to see a hillside in April massed with hundreds of these flowers nodding in a gentle breeze. I find it difficult to decide whether it is the former or *Paeonia obovata* which is the most beautiful of Hokkaido forest flowers. The goblet-shaped flowers are about three inches across, pale pink and they seemed to glow in the twilight of the forest. In cultivation the white flowered form seems the more common. Whereas *Glaucidium* had been present in hundreds, the paeony was an occasional plant; in fall it provided a second display as the seed pods split to reveal a mixture of fertile and infertile seeds, the former black and the latter red. Whilst *Paeonia* was once in *Ranunculaceae*, it is now in a family of its own *Paeoniaceae*.

So far the families mentioned have been dicotyledons, now it is the turn of the monocots. Whilst terrestrial orchids were numerous, all had died down. In wet places there were tall spikes of fleshy red fruits of *Arisaema*: there are a large number of species in Japan but I was unable to put a specific name to any that I found. The predominant family was *Liliaceae*. In October, it was the fruits which provided a display; these were red in species of *Maianthemum* and *Streptopus*, black in *Disporum* and *Polygonatum* and deep blue in *Clintonia udensis*. A very common plant in the forest was *Heloniopsis orientalis* which in October had a rosette of narrow leaves surrounding a large resting bud; in summer there is a spike of pinkish-purple flowers. Almost as common was a flowering onion, *Allium victorialis platyphylla*; a few broad ribbed leaves lay flat on the ground below a spherical head of white or cream flowers. The genus *Erythronium* is most widespread in North America, especially along the west coast but there is one species in Japan, *E. japonicum* with blotched leaves and deep pink flowers. *Trillium* is also predominantly North American but a few species come into Asia with three species in Japan. These are less showy than those of North America and not so easy to grow. The largest and most showy is *T. kamschaticum* in which the petals which are white can be up to an inch in length; in April hundreds of flowers can be seen on the forest floor. Next in size and less common is *T. tschonoskii* also with white flowers but the smallest, aptly named *T. smallii*, has no petals but the sepals are one-fourth inch and of a deep maroon.

After the spring flowering trilliums come the summer flowers of the toad lilies, species of *Tricyrtis*. Two species occur in Hokkaido: *T. affinis* with white flowers spotted with purple and *T. latifolia* which has the same purple spotting but on a yellow background. The best known genus in this family is that of the true lilies. Amongst this large family, one that is well known is the tiger lily which now has to be called *Lilium lancifolium*. In cultivation this lily is sterile producing no seed. In the forest I was able to collect seed so it will be interesting to see when they flower if they differ in any way from the form that we know best. The other species, *L. medeloides* is rarely seen in cultivation, and though I collected seed I did not see it, nor have I ever seen it in flower. It is described in books as one of the less attractive species with yellow turks cap flowers which have an unpleasant scent. Common in all Hokkaido forests and in some present in many thousands, was a very impressive *Cardiocrinum cordatum glehnii*. I have seen it in spring as its shoots emerge from the ground and in fall when its strong stems, four or more feet in height, stand erect with upward pointing seed capsules. The first time I have seen it in flower is this year from a bulb which I brought back with me. This plant only reached two and one-half inches and had a number of outward pointing trumpet-shaped flowers about six inches in length which were greenish white on the outside and splashed with purplish red and yellow inside. On my plant there were six flowers but according to books the number can be as many as twenty but I must agree with them when they say that it is inferior to the Himalayan *C. giganteum*.

What must be obvious to any reader is the number of genera which are common to both North America and to Japan.



Book Review

"THE OXFORD ENCYCLOPEDIA OF TREES OF THE WORLD," Bayard Hora, Editor. Oxford University Press, 1981. Price \$24.95.

We do not lack good quality, pretty books on trees. America's coffee tables are well furnished with them. It is thus, perhaps surprising that a man who is an expert on fungi, and on the flora of tropical east Africa had edited a brilliant new book on trees. The Oxford Encyclopedia of Trees of the World should not be confused with previously-published books with Trees of the World titles. What Bayard Hora, a retired British botanist, has done is edit the most comprehensive single volume on trees I have seen.

He has impressive helpers. The 39 contributors include people like Peter Cox of Scotland, Mr. Puddle of Bodnant, Wales, L.A.S. Johnson of the Royal Botanic Gardens, Sydney, Australia, Professor Monseleise of Jerusalem. In the process he has avoided the tendency to inbreeding in technical writing, the tendency to look solely to homeland sources as containing all the world's knowledge.

This is an exhaustive collection by any definition. It indexes 2,200 scientific and 1,400 common names. In its pages will be found those southern hemisphere genera usually slighted in northern hemisphere treatises. Do you like *Nothofagus*? Hora's book illustrates two species with color photographs, nine species with drawings, and in three pages describes all 36 known species!

Nor is this a quick recapitulation of old data. The book sparkles, is alive with concise and colorful writing. Camellias begins "First a note on pronunciation--the middle syllable should be pronounced to rhyme with fell and not feel." Of poison oak we are informed that a first-aid treatment for the poison is to "wash affected parts as quickly as possible, with a one percent solution of potassium permanganate." And how did they find out that "the same resinous juice is, however, outstanding as an indelible ink for marking linen, being virtually ineradicable?" Vine maple is called (aptly) a "usually leaning small tree." Birchbark, the author notes, is impermeable to water and can therefore be used for roofing. Birch twigs and bark also yield an oil which is used as a preservative and gives the fragrance to Russian leather. Someone has worked very hard on this book to have come up with so much information not generally found in a work of this scope.

It is a most quotable book.

On trees in the changed urban environment: "In this respect it is as well to remember that a tree has no option but to die when its environment changes for the worse."

On pruning trees back hard (the process known as pollarding): "In the end a hideous tree looking like a hatstand in winter and a lavatory brush in the summer is formed."

While the book is highly readable, with good information, it does not sacrifice botanical accuracy in the attempt. Witness this properly intimidating treatment of Chilean incense cedar (Genus *Austrocedrus*): "It was formerly included under *Libocedrus*. It differs from this genus in having scale leaves that are much more strongly dimorphic--the facial ones being one-quarter (or less) the

length of the lateral ones (one-half in *Libocedrus*)--blunter and rhombic to ovate as against triangular, and cones comprising four valvate scales, only two of which are fertile, each with one or two unequally winged seeds." There are identification keys here to the important species of the major genera of trees. The keys offer reasonable possibility of success for the layperson attempting to identify a totally-unknown tree. Much of the keying is done by leaves and various attributes of the tree in addition to the usual flower-and-seed ones, and the keys appear to be workable. I especially like the global distribution, maps showing the worldwide homes of many genera. In worldwide distribution, Rhododendron appears to about lead the parade, from solid representation in the tropics to huge arctic populations.

Here is a wide-ranging bill of fare of chapters to choose from:

"What is a Tree?" A smoothly-presented lesson on tree growth and physiology.

"Forests and Forest Ecosystems" uniting forestry, ecology, botany.

"Trees and Man" the forest economics side that horticulturists often do not understand, forest products, urban forestry, insect and disease problems.

"Trees of Every Kind" the heart of the work, with separate chapters on tree-ferns, tree-cactus, palms and other monocotyledons. "Trees of Every Kind" means just that, when you start adding the tropical ones. I thought I was fairly well versed in trees, and this book includes more than 150 entire GENERA I had never even heard of!

"Trees of the Tropics" a new world unfolds.

"Identification of Trees"

The Oxford Encyclopedia of Trees of the World is overwhelmingly beautiful, illustrating more than 500 species, including several hundred color photographs, many of full page size, crystal clear, superbly composed.

If you lack one really good book on trees, this is a wonderful way to spend \$24.95. It would have been a bargain at \$35.

Marvin Black

THE FIRST PLANT TOUR TO KOREA

"A Horticultural and Botanical Tour of Korea"

The Center for Urban Horticulture of the University of Washington is planning a twenty-one day tour of Korea in the fall of 1982 lead by J. A. Witt, Curator of Plant Collections. Designed primarily to see interesting botanical areas, horticultural features, and arboretea, the tour will also include visits to Korean cultural centers.

The itinerary will include several national parks, the Chollipo Arboretum, trips to Cheju Island and the seldom visited island of Ullung. Accommodations will range from first class hotels to native inns and participants will make several all-day walking tours to see the native flora. Arrangements in Korea are being made through the Korean Tourist Bureau and Mr. Carl Ferris Miller, an authority on Korean horticulture and botany. The cost will be approximately \$2,800 including airfare, transportation, and accommodations in Korea with a number of meals included. Tentatively, the tour will leave Seattle on September 19 and return October 10. Those interested should contact Mr. Witt at the Washington Park Arboretum, XD-10, The University of Washington, Seattle, WA 98195, (206)-543-8800.

N.O.H.S. NOTES

SUMMER 1982

Supplement to the Horticulture Northwest

Shirley Gorman, Editor

President's Letter

Dear Members and Friends of N.O.H.S.:

We have a busy spring with N.O.H.S. The Annual Dinner was held in April at the Broadmoor Golf Club. We were pleased to present to the University of Washington Center for Urban Horticulture a check in the amount of \$10,000.00.

The first Perry Johanson Memorial Lecture was held in May. We had the pleasure of presenting Sir Peter Shephard of London, England who spoke on "The Eye of the Designer." This lecture was so well received in both Seattle and Tacoma.

June 15th N.O.H.S. will co-sponsor with the Rock Garden Society a lecture "Fifty Years A Nurseryman." Alan Bloom from Bressingham, England will be the lecturer. This is an additional evening lecture held at the Museum of History and Industry.

June 25th and 26th will feature the N.O.H.S. annual Fern Sale. It will be held at the Crossroads Shopping Center in Bellevue. Sue Olson and her committee always have such outstanding, high quality and rare plant material. Be sure not to miss this exciting sale!

I look forward to the challenge of an exciting year as President of N.O.H.S.

Sincerely,

Katherine Carey

FERN SALE

June 25 - 10 A.M. - 9 P.M.

June 26 - 10 A.M. - 4 P.M.

Crossroads Shopping Center, Bellevue

Indoor and Outdoor Ferns, Unusual, Rock Garden Ferns



NOHS FALL PLANT SALE

September 30th and October 1st
Bellevue Square

Come work with us,
learn and have fun.

Volunteers call:

Jean Wilcox, Chairman 322-8771



NOHS Note Paper and Envelopes

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by Sally Dickman and Maureen Kruckeberg

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WELCOME NEW MEMBERS

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ALPINA RESEARCH
 630 SE Rene, Gresham, Oregon 97030

BROWN, Mrs. Edmond L. (Anne) 776-9013
 1563 9th North, Edmonds 98020

CLARK, Anne Clarice 845-3156
 901 16th St. NW, Puyallup 98371

COLEBROOK, Linda 966-5859
 6906 Goodwin Road, Everson 98247

COOPER, Robert E. (Jane) 743-7213
 4620 156th St. SE, Bothell 98011

DENVER BOTANICAL GARDEN 575-2547
 Solange G. Gignoe - Librarian
 909 York St., Denver, Colorado 80206

DOLSHEY, Mr. & Mrs. Frank (Catherine) 546-5603
 23324 Park Road, Edmonds 98020

DOONAN, Stephen G.
 29415 SE 82nd St., Issaquah 98027

DRAGER, Louise A. (Evelyn) 329-0623
 1654 Shenandoah Dr. E, Seattle 98112

DOWLING, Susan 784-1189
 6729 Sycamore NW, Seattle 98117

ELMS LANDSCAPING MAINTENANCE 688-7174
 400 Howard Ave., Eugene, Oregon 97404

FANCY FRONDS NURSERY 284-5332
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 1911 4th Ave. West, Seattle 98119

FLUKE, Mrs. John M. (Lyla) 363-3633
 1206 NW Culbertson Drive, Seattle 98177

GAHELEIN, Roger 98177
 1204 NW Culbertson Drive, Seattle 98177

GRIFFITHS, Mrs. Albert V. 454-1749
 (Jacqueline-Polson)
 954 88th Ave. NE, Bellevue 98004

GILMAN, Mary Jean 789-2973
 645 NW 84th, Seattle 98117

THE GREENERY 641-1458
 Lynn Watts
 14450 NE 16th PL., Bellevue 98007

GROSS, Mr. & Mrs. Stephen W. (Nancy L.)
 6608 Foster St. Road, Snohomish 98290

HANSEN, Ruth M. 289-5832
 3514 N Russet, Portland, Oregon 97217

HORTISCAPE NORTHWEST INC. 745-9621
 Michael Doyle
 3105 Russel Way, Lynnwood, WA 98036

JOHANSON, Peter 329-2434
 2817 E Park Drive, Seattle 98112

JURICH, Bridget P. (Mrs. Jay E.) 488-8201
 P. O. Box 3562, Bellevue 98009

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Seattle District Corps of Engineers
3015 NW 54th St., Seattle 98107

LECKENBY, Mrs. Lloyd (Freda) 459-2094
501 Wildcat Drive SE, Olympia 98503

MATHEW, M. V. (Librarian)
Royal Botanic Garden
Edinburgh EH3-5LR SCOTLAND

MORRIS, Mrs. J. Newton (Virginia) 232-6986
6705 West Mercer, Mercer Island 98040

PEARSON, Phil
27801 SE High Point Way, Issaquah 98027

PIEHLER, Helen H. 364-7329
11050 Exeter Ave. NE, Seattle 98125

PRODHAN, Kesab C IAS
Secretary to Government Gangtok
Sikkim INDIA

RATHJE, Mr. & Mrs. T.A. (Evelyn) 283-3692
4638 36th Ave. W, Seattle 98199

ROSEN, Elizabeth 325-6471
2807 11th Ave. E, Seattle 98102

SANDELIN, Margaret 283-4404
2609 4th Ave. West, Seattle 98119

SCOBY, Mr. & Mrs. Charles (Viola) 226-2860
13112 158th SE, Renton 98056

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Unit 103, 150 Melrose Ave. E,
Seattle 98102

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11828 SW Riverwood Road,
Portland, Oregon 97219

STRONG, Dorothy (Mrs. H. M.) 523-9197
3018 E. Laurelhurst Dr. NE, Seattle 98105

TITUS, Paul H. (JoAnne) 584-5652
#38 Country Club Dr., Tacoma 98498

WALKER, Sally
P. O. Box 50503, Tucson, Arizona 85703

WALLS, Christopher K. 752-5736
918 N. Lawrence, Tacoma 98406

WOMACK, Dock
5618 N 43rd, Tacoma 98407

The Roots of the N.O.H.S.

Betty Carey Miller

The Pacific Northwest urban and suburban areas are well known for their rare scenic beauty. But the pressures of urbanization threaten. Horticulture is one of the sciences best able to influence the urban environment through research and education on effective use of plants.

The Northwest Ornamental Horticultural Society is keeping horticulture alive and active. It is the only independent horticultural society in the Pacific Northwest. It provides horticultural education programs for gardeners, landscape architects, nurserymen, and students. It provides financial support for scholarships, grants, and other horticultural endeavors. The Society has been a primary force in the initiation and establishment of the Center for Urban Horticulture at the University of Washington. This Center is the first academic program of research, teaching and continuing education in the United States on utilization of plants to maintain and enhance urban and suburban environments. This program has the potential of providing world leadership in urban horticulture, combining the unusually fine climate of the Puget Sound Basin for growing plants, a great research and teaching university in the midst of progressive urban centers, and the support of large and diverse horticultural and forestry industries and support organizations.

The NOHS is involved with the public planting of our thoroughfares and public parks. It serves as a consequential source of information and education on environmentally tolerant plant material--plants which are tolerant of air pollution and drought, are insect resistant and demand only minimum maintenance. The source of income is entirely from the private sector. The NOHS carries no significant operating costs since there is no office or employee expense. A percentage of the membership dues and lecture admissions covers printing and mailing costs. The membership has grown to nearly 700 entirely on its own merit with no membership drives. All responsibilities are carried by volunteers serving as board members or committee members. Participants in the production of our programs are not restricted to the members. In fact, we urge the involvement of non-members.

To date, the NOHS has contributed nearly \$150,000 for horticultural programs. At the age of fifteen years, NOHS has become recognized nationally as one of the most forward-thinking independent horticultural organizations in the United States. It has recently established a Horticultural Education Fund of \$100,000 to expand its educational program. The first solicitation drive has realized over \$50,000.

In addition, the NOHS has committed \$50,000 in support of the University of Washington Urban Horticultural Center. It has initiated a plan to provide seasonal color in Freeway Park with low maintenance perennials to avoid the high cost of planting and maintaining annuals. The Society has determined the plant material to be used, coordinating this effort with the City Park Department, and is promoting contributions of the \$70,000 cost of plant material. It is also currently developing and implementing a landscape plan for a Heritage Garden at the Museum of History and Industry in cooperation with the City, the University, and support Foundation.

Descriptions of other previous projects have been published nationally and have influenced other horticulturally oriented organizations to undertake similar programs and projects such as the Horticultural Education Fund and derivatives of the Horticultural Festival held in the metropolitan district of the city.

This is an impressive account but, from the human interest standpoint, it has been anything but easy to accomplish. The organization has weathered every conceivable kind of stumbling block. However, repetitions have been avoided, basic strength of purpose has endured and each achievement has served to inspire another.

Horticulture, incidentally, is a science closely related to biological science in dealing with the factors which influence plant life. Many horticulturists are primarily amateur gardeners who learn from their own experience as well as others, from plant societies and prominent plantsmen. There is considerable literature available authored by famed plant collectors and educators, not to mention the encyclopedias as a source of reference, as well as specialized academic courses offered by extension services, community colleges and universities as supplementary sources of education for the gardener. The technical plant sciences offer explanations of how plants respond to photo period and other environmental factors, how growth is controlled by hormones, and genetic control of plant responses. But for the gardeners there is no substitute for experience. The best teacher remains and always will be personal experience.

The NOHS was founded in 1966 by fifteen knowledgeable and dedicated horticulturists. In charting a course of activity, we were motivated by both national and international professional opinion that the Pacific Coastal Northwest has the potential of being the horticultural center of the world since our many microclimates permit us to grow a greater representation of plant material than any other single area of the United States and all of the world. Obviously, the door was open to prove it! And prove it we did:

In 1969 we staged a Horticultural Exhibit at the Pacific Science Center on the occasion of the 11th International Botanical Congress hosted by the College of Forestry, University of Washington. We featured plant specimens of the Ericaceae family,* exhibiting the largest representation from around the globe of this family grown in any single geographical area. The exhibit was awarded an Achievement Medal by the American Horticultural Society.

Dr. Henry T. Skinner, Director of U.S. National Arboretum and one of the national judges, expressed his opinion that the specimens exhibited were the finest to be grown anywhere. This was confirmed by a number of the delegates from 80 different nations and several of whom commented on seeing a species native to his own country which he had never seen before.

* considered by many the most ornamental of the woody plants and includes our famed Northwest rhododendrons and azaleas.

1972 brought us a number of awards and citations from national organizations as the result of undertaking another exhibit at the Pacific Science Center for the American Horticultural Society's Annual Congress. We also hosted this Congress and it was a herculean task! This time we aimed high, and the exhibit included a representation of nearly the whole plant kingdom excluding the tropical plants. The exhibit remained open an extra day for the benefit of the public.

In 1976 another idea, a Horticultural Festival with a subtitle, "Treasure our Earth," was conceived and developed entirely by the NOHS. It fell into place as an added feature of the bicentennial year "Juan de Fuca" celebration. \$15,000 was solicited from private sources and \$500 was contributed by the Downtown Seattle Businessmen's Association. We were responsible for involving all participants and exhibitors, the extensive organization involved, and both manning and staging the event. Over 100 volunteers participated. Educational exhibits, flower arrangements, and a plant sale were programmed by amateurs, public agencies and plant societies. It was effectively presented throughout Seattle--First National Bank and IBM buildings, Plymouth Congregational Church, and the Seattle Public Library. It was given repeated accolades by all news media and other local periodicals (i.e., "The Power of a Plant--as we watch the astute attorney cross the street carrying a briefcase in one hand and a pot with a trailing vine in the other and wearing a broad smile").

An enthusiastic plant sale committee ignored a caution to limit their stock to small take-home plants or suitable office inhabitants and provided a full-fledged sale geared for landscaping which created an astronomical task in returning or disposing of excess large plants. Regardless, a profit was realized, but only at the expense of an exhausted but wiser committee. This function won us the coveted Bulkley Medal Award from the Garden Club of America, with special commendation to an exhibit by the NOHS Study Groups.

As a result of these activities, a major bonus occurred. The NOHS created occasions for the eminent horticulturists brought to Seattle by the aforementioned events or as speakers for our lecture series to meet with the administrative officers of the University of Washington. They were able to effectively substantiate the need for a horticultural college at the University. Since there was no other source interested, the NOHS contributed \$37,000 for a schematic plan for such a development to be housed on the University's Union Bay property. This was a timely support, the University was receptive, and the concept is now a reality with the final plans properly stamped and approved. The Center for Urban Horticulture program is now established with Dr. Harold B. Tukey, Jr. as Director, who was judged the most eminently qualified in the U.S. for this position. The final step of development depends on the economy.

The NOHS has found it rewarding and of mutual benefit to coordinate our efforts with those of other plant societies. It also gives financial support to the many other horticultural organizations literally springing up around us, such as the Rhododendron Species Foundation and Portland's Rae Berry Garden, and carries supporting memberships with many local and national horticultural organizations. The more we are able to boost each other the greater the benefits are for all of us. In 1981, one of our contributions was \$1,000 to the University of St. Andrews in Scotland in support of the first field research expedition in 35 years to western Yunnan, China. In return, we received packets of seed of potential new plant introductions.

The NOHS coordinates its efforts with our small specialized plant societies by providing the circumstances for them to present demonstrations or lectures for interested gardeners. Many of these specialized societies consist of a small number of experts and are without the means to physically stage sizeable exhibits, demonstrations or present lectures. A widespread notification of such an occasion can also be channeled through NOHS. The members of these societies have a great deal to offer which is of tremendous value to the general gardener.

Now for the meat of our educational efforts, the NOHS Lecture Series as designed for you if you ever plant a plant. Do you know:

That if a plant likes morning sun and afternoon shade, it may not like morning shade and afternoon sun?

That root rot is a primary cause of plant mortality in the Northwest and commonly caused by poor drainage?

Why leaves curl or drop in cold or hot weather extremes?

How to prepare a planting site providing the essential needs in order that the plant can thrive on its own?

That Seattle is one of the few (if any other) major cities developed on glacial strata?

That to arrive at less maintenance, it is necessary to do more planning and thinking before planting?

What a species plant is?

That use of insecticides can upset the insect balance around a neighboring species plant if it has not been attacked?

If lichen, moss and fungi are harmful?

The Lecture Series is our means of covering all these subjects for the gardener's benefit.

The NOHS feels strongly about providing additional services for its membership; thus, in 1979 a seed exchange was initiated. Emphasis was not placed on quantity, but quality, little known or grown, new or unusual natives or exotics. It was not the committee's desire to duplicate existing exchange schemes of other societies, but by extending the cut-off date for contributing seed to mid January, ours could accommodate those seed that ripen in November and December, too late for inclusion in other seed lists.

Growing plants can be a fascinating experience, mentally and physically challenging, and is an endless learning process. The NOHS tries to stimulate the interest of our gardeners and for this purpose publishes a quarterly journal, Horticulture Northwest. It has proven itself a tried and true gem. It has attracted a significant national and international support and drawn from equally representative sources for interesting horticultural articles.

For the moral and realistic support we have needed, we can look to our roster of a notable national representation serving as our advisors. On this score we are particularly indebted to Dr. Richard A. Howard, Director Emeritus, Arnold Arboretum, Harvard University.

"When the world wearies
and
Society ceases to satisfy
There is always the garden"

anonymous



Fabulosus Fashions Net \$4,554

The NOHS continuously programs fund raising events to support horticultural education and the University of Washington Center for Urban Horticulture.

Fabulosus Fashions was an enterprising idea in the form of a luncheon held at the Seattle Golf Club on March 11th, a brilliant, nippy, sunny day, when 250 women enjoyed the results of many months of planning for the gala event. It featured an exoticus, sculptus, revolutus, reversus, dissectus and elegantissimus fashion show. The wearing apparel was provided by John Doyle Bishop and presented under the direction of Jayne Keal, for many years coordinator of Seattle's notable fashion shows. The commentary sparkled as it was delivered by Bernie Caverly. During the social hour prior to luncheon, wearing apparel suitable for either the golf course or gardening from the Golf Club Pro-shop was modeled as well as Lesser Seattle gardening clothes from Marmot Mountain Works. The decor featured a pair of 1880 vintage mannequins amusingly gowned by David Adams, Florist.

The event was enthusiastically responded to and additional acknowledgments must be noted such as the hand printed invitations by Karen and Michael Maloney and Marili Boyd, a \$500 contribution from Molbak's Nursery, the models both professional and amateur, and the thirty-five patrons.

The individual talents of each of the experienced and capable committee members was fully exploited, namely Bernie Caverly and Betty Miller as co-chairmen assisted by Stephanie McGowan, Mariella Parks, Mary Fleming, Jo Hotson, Nancy Peterson, Sis Lea, Marili Boyd, Judy Addington and other NOHS members whose contributions enabled the event to flow with ease and to net \$4,554.



Alpines '81 Members' Report

THE BURREN

Nan Ballard, Issaquah, Washington

After the end of the conference came what would prove to be the highlight of the entire five weeks, our visit to Ireland. Led by Brian Mulligan, Director Emeritus of the University of Washington Arboretum, 12 of us hired a van and driver and spent the next 12 days seeing exquisite private and public gardens throughout the Republic of Ireland. We had to forego our scheduled trip to Belfast because this was just at the time that Bobby Sands was dying and no time for 12 Americans in a white Mercedes van to add to the confusion. Many of our hosts were lifelong friends of the Mulligans and were gracious in their hospitality. I shall never forget the delicious teas with hot scones, delectable pastries and cakes or sherries or champagne served us in lovely old homes filled with heirlooms of centuries. All this and the beautifully and lovingly tended gardens, too.

With all of that, the highlight of the Irish trip was our visit to the Burren, an extensive rocky outcropping in County Clare, covering 25 miles from east to west and more than 15 miles from north to south. In one area, it slopes gently from over 600 feet above sea level down to the Atlantic coast. We were delighted, before we left home, to read about the Burren in the April (or March?) issue of National Geographic, but it was much more impressive than we anticipated. The carboniferous limestone landforms are crisscrossed with massive (down to hairline) cracks. Over the thousands of years these have filled with soil and in them are found an amazing variety of plants. We saw orchids, gentians, *Dryas octopetala*, violets (both known and rare), ferns, and on and on and on. There are plants from the north and plants from farther south carried in the advance and retreat of the ice sheet, leaving a mixture and diversity which is almost unbelievable. We spent five and one-half misty, cold hours on the Burren almost wearing out our guide, Mrs. Keane, owner of our hotel and author of a book about the Burren. She was surprised at our endurance and our enthusiasm. Usually, she said, most of such a group would find their way back to the bus after an hour or so. Our bus driver regretted these attributes. He ran out of reading material, left the warmth of the bus to try to understand what we were getting so excited about . . . just a bunch of green leaves and an occasional scrawny bloom. He could show us better in his own backyard. This was his first trip to the Burren and, he rather hoped, his last.

I would love to return to spend weeks at Mrs. Keane's hotel. There were vast areas of the Burren we could not get to in our allotted time . . . geologic and archeologic features I would love to see. Some believe that once the Burren was covered with trees which were ruthlessly harvested by newcomers to the land from the north and from the south who denuded the land of timber and sent it back to their homelands. Whatever the cause, the barren Burren looks like a desert with dunes of rock and great blocks of sandstone tilted this way and that. Awesome!



Canada to Host Horticultural Therapy Conference

The National Council for Therapy and Rehabilitation through Horticulture will hold its Tenth Annual Conference August 16-19, 1982 in Vancouver, British Columbia, Canada. The theme of the conference is "Never Too Old to Grow - Plants and People." The program will include a wide range of topics focusing on horticulture as: a teaching/learning aid; a medium for health promotion, intergenerational interaction, rehabilitation, and recreation; a career; and, an issue of interest for the use of public space for horticultural therapy.

The previous conferences have provided an excellent international forum for gaining and sharing information on the new field of horticultural therapy. Papers on the topic themes and displays by individuals and institutions interested in horticultural therapy are invited.

For information write to: Dr. Roy L. Taylor, Director, The Botanical Garden, The University of British Columbia, 6501 N.W. Marine Drive, Vancouver, B.C., V6T 1W5 Canada.



What's in a name? We sometimes come to think of botanical names as long collections of letters rather than words with meanings. True, many are named after people but many others have delightful secret meanings, a little like the secret codes we played at as kids. *Ranunculus* means living with frogs. *Polypodium* refers to the ferns' branching rhizome of many feet. *Azolla*, the little floating fern is derived from to destroy by drying. *Cortaderia*, pampas grass, means cutting, obviously referring to the leaf edges as far too many people know! *Xerophyllum* is literally dry leaf. *Hemerocallis* is Greek for beautiful for a day. *Polygonum* and *Polygonatum* are both from the Greek for many-kneed. Or, *Eriogonum*, wooly-kneed? *Nasturium*, distortion of the nose? *Oxalis*, sour. *Chimaphila*, winter-loving. Venturing back into the world of animals, there is *Myosotis*, mouse-ear and *Onosma*, ass-smell or *Lycopersicon* tomato, wolf-peach and *Lupinus*, wolf alluding to the sinister qualities associated with the wolf. Such dream-castles and word-webs are spun on a rainy afternoon with the aid of botanical encyclopedia.

Dennis Thompson, Seattle, Washington

NOHS Note Paper and Envelopes

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Eight notes per packet--two of each drawing

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Leaf: *Cyclamen
hederacifolium*

Flower: *C. europaeum*

Tidbits

by Ladybug



Rhododendron-Ledum rust: It is our understanding that at present there is no known chemical control of those rusts that can infect *Rhododendron* and *Ledum* species. Have any of our members had experience with this rust and its control? Can just the infected branches be removed, or must the entire plant be destroyed? Is there a secondary host? Are there specific species of *Ledum* and *Rhododendron* affected by the rust? Once introduced to the garden, how extensive can the damage be? Any information you might have please share with our members.



Springtime and Podocarpus nivalis: In our enjoyment of the glorious spring flowering trees, shrubs and plants, we might overlook less showy ornamentals whose peak of interest is also at this time of year. *Podocarpus nivalis*, interesting New Zealand member of the *Taxaceae* family, is dioecious (requiring both male and female plants to produce fruit). When both plants occur in the garden one is surprised by the numerous red succulent fruit with one or two bright green pointed seed protruding from the tip. When staminate and pistillate forms are compared, differences can be noted in the leaf structure, the pistillate form having longer, narrower needle-like foliage, sometimes slightly curling. These evergreen ornamentals should be better known and more frequently grown as specimen shrubs, or to enhance a large rock garden or wall where they can cascade freely.



Hartford fern, Alices fern or climbing fern, *Lygodium palmatum*, is described by the Royal Horticultural Society Dictionary of Gardening as being a greenhouse plant, however since it is native to Connecticut and New Jersey, one would think it would be hardy in Pacific Northwest gardens. Although once abundant on low meadows and river banks in its native habitat, it is now nearly extinct due to having been heavily collected as decorative material. It is interesting to learn that as long ago as 1867 the citizens of the State of Connecticut were sufficiently conservation minded as to prohibit the gathering of roots or fronds from that time onward. Plants should be purchased from a reliable propagator, not from nurseries known for selling collected plant material. It has been offered occasionally in the NOHS Fern Sale. We have not learned how well this dainty climbing fern is prospering in our area.



COLNBROOK, March 8, 1838 J.S. If you think the following worth notice, you may rely on the fact. We have now living at Taplow Common, in this county, near Maidenhead, a man in his one-hundred-and-second year. He is in perfect good health and in the enjoyment of all his faculties. I saw him last summer working in his son's garden, with whom he lives; and last week sawing wood for the fire.



It was with sadness that we received the last issue of Davidsonia, the outstanding publication of the University of British Columbia Botanical Gardens. The action was made necessary by severe budget cuts of University funds to the Botanical Gardens, an action that we subscribers regret as Davidsonia was always interesting and informative for us here in the Puget Sound area. It is our sincere hope that it will not be long before the Journal will be reactivated and published on a permanent ongoing basis, as we feel it was an important addition to our personal reference libraries.



Regarding the interesting article "The Mysteries of Polystichum Californicum," this issue of Horticulture Northwest, author Ed Alverson, 12530 S. E. 47th Place, Bellevue, Washington 98006, invites inquiries from readers, feedback and/or an exchange of information.



What's in a name? Taxonomists are sneaky--a little like doctors with their indecipherable handwriting. When they name plants they frequently impart secrets of their origins. For instance, consider plants growing in rocks. *Saxifraga*, *Lithophragma*, and *Petrocoptis* are genera that all refer to crack-in-rock or breaking-rock. *Empterum* means growing on rock. Several specific epithets also refer to rock-dwelling (*Petraeus*, *petrensis*, *rupestris*, and *saxitalis*) and rocky (*petrosus*, *rupestris*, *saxeus*, *saxosus* and *scopulosus*). These terms originate from *petra* (*petris*) a rock or crag; *rupe*, a steep rock or cliff; *scopulus*, a pointed or projecting rock, cliff or crag; and, *saxo*; a detached large rock or stone. Associated terms *litho*-, stone; *calcareum*, limestone; *alpinus*, growing in Alps or alpine zone; and *montanus* and *oreo*-, mountain. *Littorariis* and *maritimus* pertain to the seashore. *Palustris* relates to swamps or marshes (*helo*-, Greek) and *turbarium* pertains to peatbog and *lacus* pertains to lakes. *Rivularis* suggests streams and *aquaticus* and *limn*- to water-dwelling. (*Limnanthes*, *Limnocharis* and *Limnanthemum*, marsh flower). *Nemophila* means grove-loving. *Sylva* may refer to forest, wood or grove.

Dennis Thompson, Seattle, Washington



DON'T FORGET! NOHS Annual Fern Sale, June 25th and 26th, Crossroads Shopping Mall, N. E. 8th St. and 156th Ave. N. E. Hours: 10 A.M. to 9 P.M. Friday; 10 A.M. to 6 P.M. Saturday. Indoor and outdoor ferns from Japan, Europe, the East Coast and the Northwest will be for sale. Our guest, Dr. Xing, from the Peoples Republic of China will be at the sale giving his slide presentation "The Sights and Ferns of Peking."

Anyone wishing to work on the Fern Sale contact Sue Olsen, Chairman, afternoons or evenings, 747-2998.



NOHS FALL PLANT SALE

September 30th and October 1st
Bellevue Square

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Jean Wilcox, Chairman 322-8771



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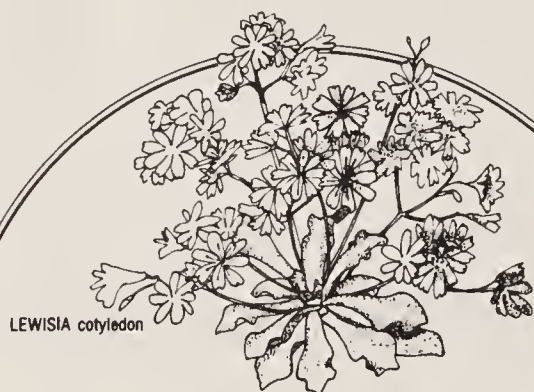
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or

Marg Baird, 454-3862

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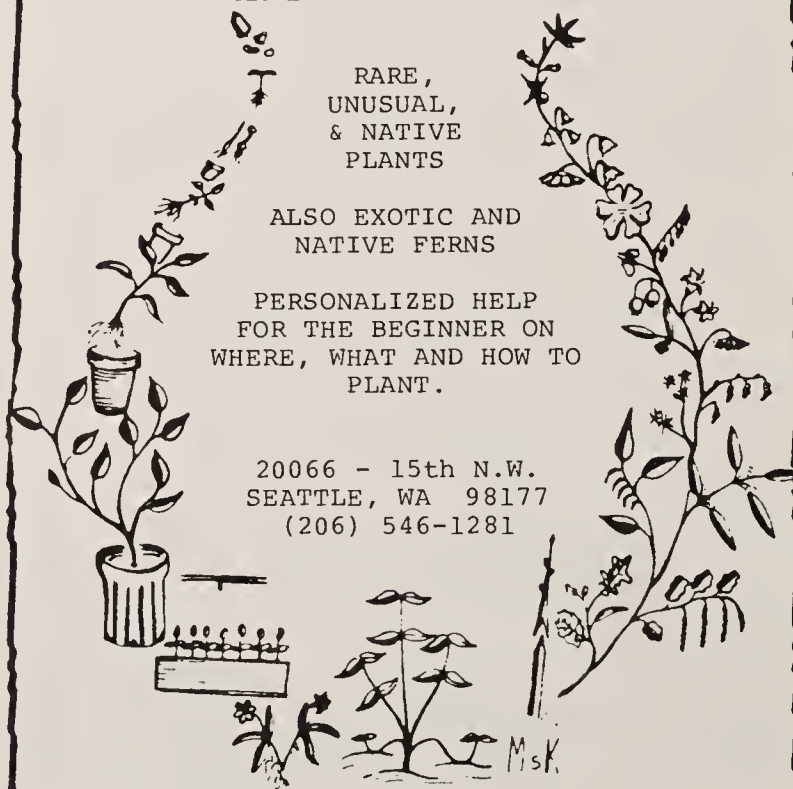
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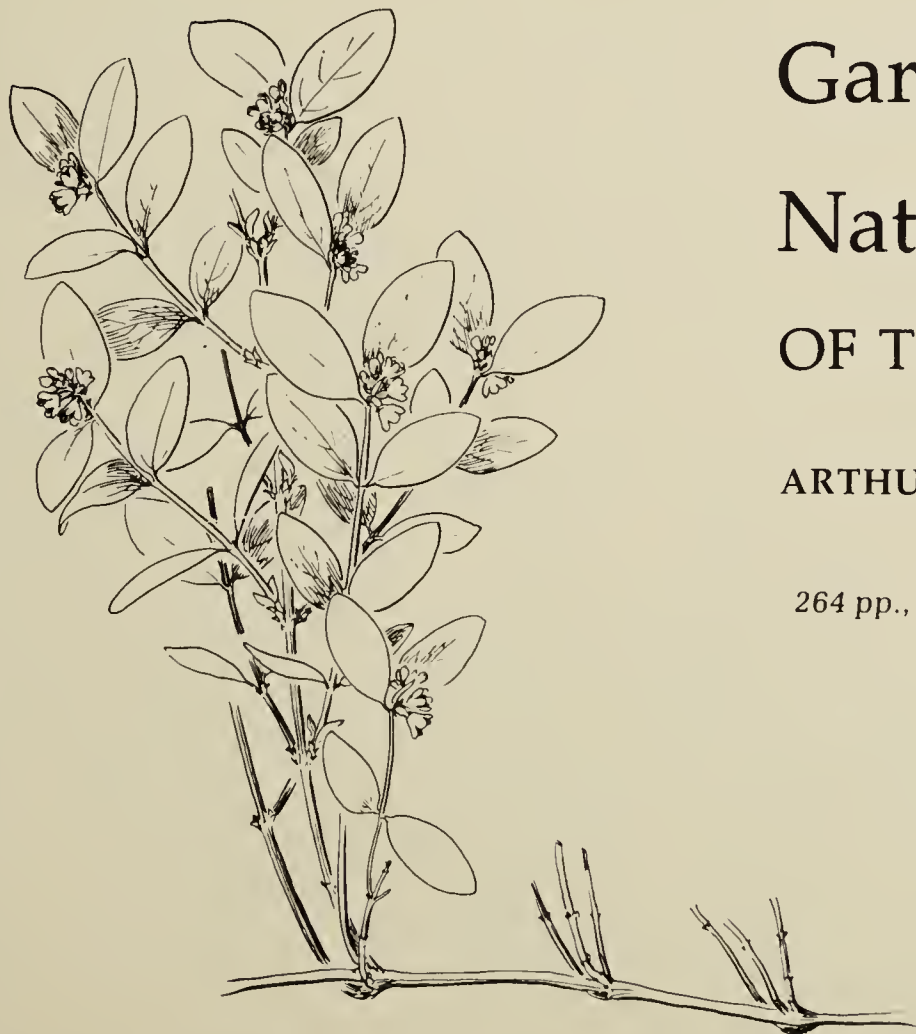
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